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09/977,552	10/15/2001	Hank E. Millet	031500487DVA	4193
27572	7590	05/13/2005	EXAMINER	
HARNESS, DICKEY & PIERCE, P.L.C.			SAYOC, EMMANUEL	
P.O. BOX 828			ART UNIT	PAPER NUMBER
BLOOMFIELD HILLS, MI 48303			3746	

DATE MAILED: 05/13/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

Application No.

09/977,552

Applicant(s)

MILLET ET AL.

Examiner

Emmanuel Sayoc

Art Unit

3746

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 18 March 2005.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 18-30,32-34 and 36-45 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 18-30,32-34 and 36-45 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 15 October 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_

### **DETAILED ACTION**

1. This office action is in response to the amendments of 10/18/2004. In making the below rejections and/or objections the examiner has considered and addressed each of the applicants arguments. Claims 18-43 are pending and are under current consideration.

#### ***Priority***

2. Benefits of an earlier application are acknowledged and the specific reference to the prior application(s) in the first sentence of the specification is noted.

#### ***Claim Rejections - 35 USC § 102***

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

The changes made to 35 U.S.C. 102(e) by the American Inventors Protection Act of 1999 (AIPA) and the Intellectual Property and High Technology Technical Amendments Act of 2002 do not apply when the reference is a U.S. patent resulting directly or indirectly from an international application filed before November 29, 2000.

Therefore, the prior art date of the reference is determined under 35 U.S.C. 102(e) prior to the amendment by the AIPA (pre-AIPA 35 U.S.C. 102(e)).

4. Claim 44 is rejected under 35 U.S.C. 102(b) as being anticipated by Heckel (U.S. 4,975,024).

Heckel in Figures 1 and 2 teach a compressor assembly comprising a shell, a compression mechanism disposed in said shell (both inherent to the compressor 2), a motor driving said compression mechanism (14), and a control block (28) including memory (42, 44) operable to store compressor event history data, compressor model type, compressor operating limits, and compressor set points. Examiner reminds applicant that the phrase "operable to store" does not require that the memory actually contain the information claimed, only that it is capable of storing the memory.

5. Claim 18-23, 25-29, 32, 33, and 44 are rejected under 35 U.S.C. 102(e) as being anticipated by Centers et al. (U.S. 6, 471, 486 B1).

With respect to claim 18, 21, 22, 26, 28, 29, 32, 33, and 44 in Figure 2A, Centers et al. discloses a compressor system and control system comprising a compressor(s) (1002) and an electronic control system(s) (1004), which is analogous to the claimed invention's control block. The electronic control system (1004) is in communication with the compressor (1002). Multiple compressors (1002) can be controlled at the same

Art Unit: 3746

time, in which case multiple electronic control systems (1004) are linked via network in a peer to peer configuration – see abstract. A remote computer used for monitoring, controlling, downloading firmware software, and communicating compressor operation data constitutes a system master as in the claimed invention. The remote computer is in communication with the electronic control systems (1004) and is operative to receive and send stored compressor configuration information to and from the electronic control system (1004) – see column 25 line 42 to column 26 line 27. It is obvious that this computer initializes the configuration of the compressor. Random access memory chips (510) are used for storage of operating data, i.e. compressor configuration information, history data, and parameter calculation results – see column 19 lines 33-37. All operating parameters, service information, shut down records, sensor input information (including temperature and pressure data), are transmitted from the electronic control system (1004) to the system master computer. All of the stored operating parameters of the electronic control system (1004) can be modified by the system master computer – see column 15 lines 5-17. The device includes a motor (100), a shell (shown not enumerated), and obviously a compression mechanism in the shell.

With respect to claim 19 and 20, the control system uses pressure and temperature sensors, among others, to detect or predict actual shutdown conditions based on the operating state of the compressor (1002). These signals are transmitted to the system master, and are indicative of an operating characteristic of the compressor – see column 9 lines 21-26.

With respect to claim 23, the stored compressor configuration information includes many compressor specific values such as model number/type – see column 27 line 37.

With respect to claim 25, the operating data, or configuration information includes at least one pressure limit, and at least one temperature limit. These limits are used as thresholds that predict abnormal compressor operation – see column 9 lines 10-15 (temperature), and column 9 lines 35-40 (pressure). The information also includes at least on time limit – column 17 line 33-38.

With respect to claim 27, There is not explicit teaching of the control block/control system (1004), including a pluggable gateway, however as disclosed in column 13 line 65, and column 14 lines 24-28, the control system (1004) includes a network interface connection (2013), among its multiple circuit boards, for connection of the control system (1004), and the compressor to the network, the master computer, and other compressors. This data interface constitutes a gateway board. Centers includes a plurality of connectors (J1, J2, J8, J11) and microprocessor boards (500), annunciator boards (600), and ARCnet peer-peer network communication interface circuits, which constitute communication interfaces or gateways.

### ***Claim Rejections - 35 USC § 103***

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the

Art Unit: 3746

invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

7. Claim 30 is rejected under 35 U.S.C. 103(a) as being unpatentable over Centers et al., as applied to claim 44.

With respect to claim 30, Centers et al. set forth a device as described above, which is substantially analogous to the claimed invention. The Centers et al. device differs from the claimed invention in that there is no disclosure of the system master selectively controlling the control blocks/control systems (1004). It would have been obvious that individual compressors, with their individual control systems (1004), are selectively controlled by the system master over the network. Compressors undergo different compression situations and the system master must be able to provide independent, and appropriate controls to the compressors.

8. Claim 34, 36-40, 43, and 45 are rejected under 35 U.S.C. 103(a) as being unpatentable over Centers et al. (U.S. 6, 471, 486 B1), as applied to claim 44, and in further view of Culp, III et al. (U.S. 5,975,854).

With respect to claims 34, 36-40, Centers et al. set forth a device as described above, which is substantially analogous to the claimed invention. The memory (510) is capable of storing compressor event history data, compressor model type, compressor

Art Unit: 3746

operating limits, and compressor set points. The Centers et al. device differs from the claimed invention in that there is not explicit teaching of the control block being mounted on the compressor. As stated above the Center's device substantially discloses the control system of the claimed invention. Each compressor within the Centers et al. control system comprises an individual control block. This control block governs the compressor it is assigned to, and interacts with a system master and other control blocks in a peer-peer system. It is the examiner's position that the exact location of these control blocks does not sufficiently depart from the inventive concept of Centers et al. device. There is no significant difference between placing all the control blocks into one control room, a control area, by the compressor but not on the compressor, or placing the control blocks on the compressors. Mounting a control block to the compressor it is assigned to would be obvious in order to integrate the design of the compressor, reduce control block to compressor wiring, i.e. network set up, and simplify control block to compressor identification.

Culp, III et al. teaches a compressor (10) with a terminal box assembly (28). The box contains within a protection module (86), which is analogous to the claimed invention's control box. The protection module, which includes vibration sensors, power supply circuits, and control circuits (Figure 4 and 7), is mounted on the compressor shell via the terminal box (column 6 line 61-62). The protection module (86) may not function the same as that of Centers et al. or the claimed invention, but it nevertheless constitutes a control module or block. The pertinent teaching here is that a control block or module can be mounted to the outer shell of housing of the compressor. Vibration



sensors were well known in the art to provide compressor operation and fault diagnostics information. Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the Centers et al. device, by mounting the control block on the compressor, and include the vibration sensors, as taught by Culp, III et al., as a functionally equivalent design choice. The applicant's motivation for mounting the control block on the compressor is to integrate the system and reduce connection lines from the control block to the compressor. In a compressor system comprising a system master, multiple control blocks, and multiple compressors, there is a minimum amount of communication lines required to connect all components within the system in a network. Minimizing such communication lines would have been obvious. It is obvious that the compressors have certain positioning constraints. If reducing communication lines were the only consideration then minimizing communication lines would be greatest if the compressors, control block and the system master were bunched together as tight as possible. Obviously this cannot be done and that the compressors have a predetermined layout. Therefore moving two a first component, say the control block, closer to a second component, say a compressor, would equally make the first component farther from an other component, say another control block on another compressor. No significant communication line is saved. Therefore the mounting of the control block on the compressor, on the grounds of integrating the system and reducing communication lines, is a functional design choice.

With respect to claim 43, the Centers et al. device differs from the claimed invention in that there is no disclosure of the system master selectively controlling the

control blocks/control systems (1004). It would have been obvious that individual compressors, with their individual control systems (1004), are selectively controlled by the system master over the network. Compressors undergo different compression situations and the system master must be able to provide independent, and appropriate controls to the compressors.

9. Claims 24, 41, 42 are rejected under 35 U.S.C. 103(a) as being unpatentable over Centers et al., as applied to claims 44, and 45 and in further view of Friedland (U.S. 5,423,190), and Sunaga et al. (U.S. 6,035,661).

Centers et al., as modified by Culp, III et al., sets forth a device as described above, which is substantially analogous to the claimed invention. The Centers et al., as modified by Culp, III et al., device differs from the claimed invention in that there is no disclosure of the electronic control system (1004) containing compressor configuration information including a serial number of the compressor, a refrigerant code for the compressor, and an oil code for the compressor. Compressor information such as the model and serial numbers identify the specific parameters (usually provided by the manufacturer), such as intake pressure, discharge pressure, capacity, voltage/current inputs, or operating temperatures. Specific data, that is critical for control system to maintain optimal operation of the compressor is stored in a memory components (538, see column 20 line 52-67). In the same manner the working fluids, whether it be compressed air, gas, refrigerant, or oil need to be specified such that their

thermodynamic properties can be specified for the control system. As seen above, Centers et al. anticipated the need for specific compressor parameter information. The properties of the compressor and its working fluid have been specified within the control system either directly, or indirectly through other parameters. Friedland in column 2, line 41-51 and column 6 lines 1-10, teaches the use of a compressor serial number to identify the type of refrigerant and amount of refrigerant used. It is common in compressors to use the refrigerant to lubricate the compressor, in which case refrigerant type would constitute the oil type. There are also cases where oil is mixed with the refrigerant, as is taught by Sunaga et al. in Table 4, and Table 5. Each table identifies refrigerant and associated oil. Applying a code to a refrigerant or oil would have been obvious for control scheme identification. Friedland teaches the use of a look-up table. It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the Centers et al. device by including into the control system (1004) pertinent information such as the compressor serial number, refrigerant code, and oil code, as taught by Friedland and Sunaga et al., for proper identification of the working compressor, its operating fluids, and the thermodynamic properties of its working fluids, using a memory stored look-up table.

With respect to claim 42, the operating data, or configuration information includes at least one pressure limit, and at least one temperature limit. These limits are used as thresholds that predict abnormal compressor operation – see column 9 lines 10-15 (temperature), and column 9 lines 35-40 (pressure). The information also includes at least on time limit – column 17 line 33-38.

### ***Response to Arguments***

10. Applicant's arguments, filed 3/18/2005, with respect to the rejection(s) have been fully considered and are not persuasive.

The rejections have been modified in response to the applicant's amendments. The prior art shows compressors of the general nature of the claimed invention particularly with control blocks with memory capable of storing the information listed in the claims. The claim does not require the actual storing of this information into the memory. Applicant's arguments that the memory does not contain specific information is therefore not persuasive. In any case the prior art of record already show that the operation related information is pertinent to the proper operation of the compressor. For example the operating limits is important to know the maximum and minimum power that the compressor can receive, refrigerant code and oil code are important to ensure the proper fluids to be used with the compressor, and compressor set points are employed to operate the compressor at predetermined configurations for specific pumping applications. This information can be manually processed by an operator. Automation of compressor control using such information has been shown in the prior art above. Friedland was cited to show that the use of a compressor serial number to identify the type of refrigerant and amount of refrigerant used was obvious in the art. Examiner did not claim that Friedland teaches any more. Therefore applicant's

Art Unit: 3746

arguments of inadequate teaching beyond this use of information is insufficient for overcoming the rejection.

### ***Conclusion***

11. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. The following references are cited to further show the state of the art with respect to compressor control and protection systems.

U.S. Pat. 5, 713, 724 to Centers et al. – teach general nature of the art

U.S. Pat. 4, 502, 842 to Currier et al. – teach general nature of the art

U.S. Pat. 5,641,270 to Sgourakes et al. – teach programming lookup tables in memory

U.S. Pat. 6,276,901 B1 to Farr et al. – teach control block on compressor

U.S. Pat. 6,129,527 to Donahoe et al. - teach control block on compressor

12. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any

Art Unit: 3746

extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

**Contact Information**

13. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Emmanuel Sayoc whose telephone number is (571) 272 4832. The examiner can normally be reached on M-F 8-5pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Timothy Thorpe can be reached on (571) 272-4444. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Emmanuel Sayoc  
Examiner  
Art Unit 3746

ECS



Timothy S. Thorpe  
Supervisory Patent Examiner  
Group 3700